State of California—Health and Human Services Agency
Department of Health Services

California Department of Health Services

DIANA M. BONTÁ, R.N., Dr. P.H.
Director

GRAY DAVIS
Governor

December 16, 2002

Mr. Brian Alcorn
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Dear Mr. Alcorn,

Thank you for the opportunity to comment on the Draft Proposed Language for modifications to the 2005 Energy Code (Section 121). Our comments pertain to the proposal to require Demand-Control Ventilation (DCV) in certain school classrooms.

Certainly, energy efficiency is a high priority in our state. However, the Hazard Evaluation System & Information Service (HESIS), and the Indoor Air Quality Section, both in the Department of Health Services' (DHS) Division of Environmental and Occupational Disease Control, recommend that the proposal for DCV in classrooms be postponed. There are important, unanswered questions about the impact that DCV will have on classroom air quality. If action is taken prematurely, we are concerned that the health and effectiveness of both teachers and students could be adversely affected in the name of "energy efficiency."

DCV controls fresh air supply based on the carbon dioxide (CO_2) generated by occupants. It serves to control bioeffluents (i.e., body odor) generated by the human occupant loading; it does not address simultaneous chemical exposures. Most DCV research has been in offices. DCV in office environments does not necessarily translate directly to classrooms. Field studies are needed to determine effectiveness in classrooms. Classrooms have additional sources of dusts and chemicals: pets, arts & crafts products, possible heavy use of whiteboard markers and cleaners, and active children. Proper ventilation and CO_2 detection rely on air mixing assumptions derived from normal office activity. Little field data is available on ventilation air mixing in classrooms, which may be very poor during exams, naps, etc. A study of a middle school[1] showed room mixing factors ranging from 0.15 to 0.74 (1.00 indicates perfect mixing). The authors comment that ASHRAE guidelines for CO_2 and ventilation may not be consistent for occupied classrooms. In a comprehensive recent review[2] of DCV, only two field studies of DCV in schools were cited. We suggest that CEC sponsor a pilot study to develop more information on DCV in California schools.

Based on our experience, many schools fail to maintain their ventilation systems. The control for outside air flow with a DCV system relies on accurate CO_2 sensors in the conditioned space and functional outside air dampers. CO_2 sensors require regular calibration; without re-calibration, drift of the sensor output will cause either insufficient or excessive outside air flows. Resources for maintenance for school facilities are generally insufficient. Neither CO_2 sensors nor damper function can be guaranteed over time for classroom DCV systems.

We know that children are more susceptible than adults to some toxic chemicals, and schools must accommodate children with a wide range of health conditions. Good indoor air quality is critically important all school occupants, but especially to the many children with asthma. We need to know how children will be affected before DCV is instituted in schools.

Sincerely,

Elizabeth Katz, M.P.H., C.I.H.
HESIS Industrial Hygienist
Occupational Health Branch

Jed Waldman, Ph. D.
Chief, Indoor Air Quality Section
Environmental Health Laboratory Branch

References

[1] Scheff PA, et al: Indoor Air Quality in a Middle School, Part I: Use of CO_2 as a Tracer for Effective Ventilation. Applied Occupational and Environmental Hygiene, 15(11):824-834, 2000

[2] Emmerich SJ and Persily AK: State-of-the-Art Review of CO_2 Demand Controlled Ventilation Technology and Application. National Institute of Standards and Technology, U.S. Department of Commerce, March 2001